

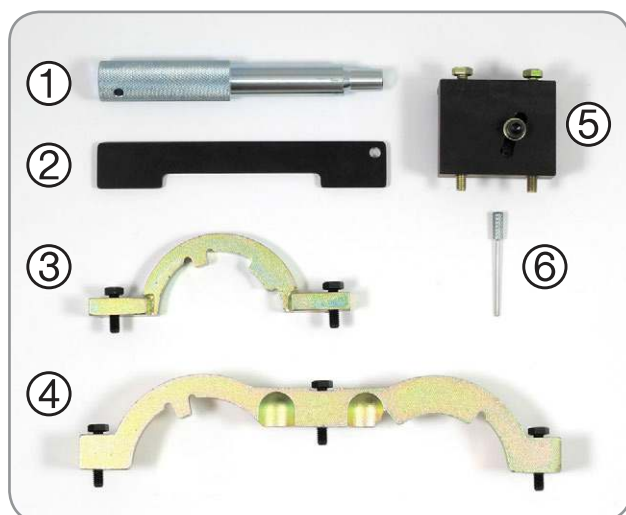
60387850

Petrol Engine Setting/Locking Tool Kit

PICHLER

Petrol Engine Setting/Locking Tool Kit

Kit Contents / Spares:



Item	Part No.	Description
1	4487	Crankshaft Locking Pin
2	5091	Camshaft Setting Plate
3	5092	VVT Sensor Setting Tool (1.0L)
4	5093	VVT Sensor Setting Tool (1.2 & 1.4L)
5	5094	Camshaft Sprocket Holding Tool
6	4489	Tensioner Locking Pin
-		Case + Insert

Additional Tools required:

4742 ignition module removal set



IMPORTANT: Always refer to the vehicle manufacturer's service instructions, or proprietary manual, to establish the current procedures and data. Product Information Sets detail applications and use of the tools with any general instructions provided as a guide only.



Applications:

1.0, 1.2 and 1.4 & 1.4 Turbo Petrol engines in:

CHEVROLET

Aveo

Cruze

OPEL/VAUXHALL

Adam

Agila-B

Astra-J

Cascada

Combo

Corsa-D

Meriva-B

Mokka

Zafira Tourer

Engines:

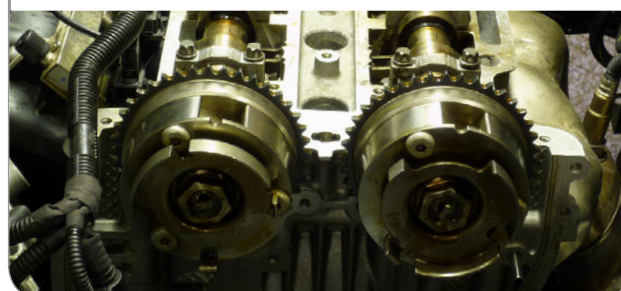
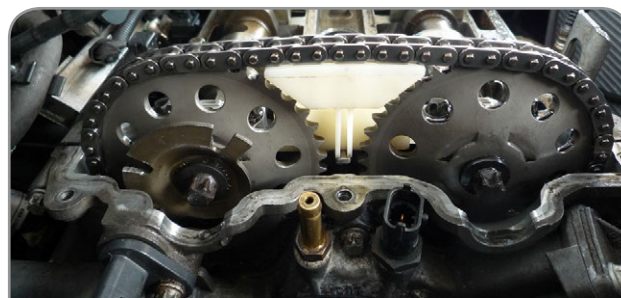
1.0: A10XEP (LDB),

1.2: A12XEL (LWD), A12XER (LDC),

1.4: A14XEL (L2Z), A14XER (LDD), LDU

1.4(T): A14NEL (LUH), A14NET (LUJ),

Twinport / ecoFLEX engines



Introduction

The GM 'A-series' chain driven petrol engines covered by this timing kit were introduced in 2009 as a replacement for the previous 'Z-series' engine.

The 1.0L engine is a 3 cylinder, twin camshaft, 12 valve unit with conventional camshaft sprockets and chain drive. The 1.2L and 1.4L engines are 4 cylinder, twin camshaft, 16 valve units equipped with Variable Valve Timing (VVT) on the Inlet and Exhaust camshafts.

A Turbocharged variant of the 1.4L engine is also available. Although similar in design to the 'Z-series' engine, the 'A-series' engine utilises the latest technology, such as variable valve timing and a turbo mounted within the exhaust manifold, to reduce weight and increase fuel efficiency..

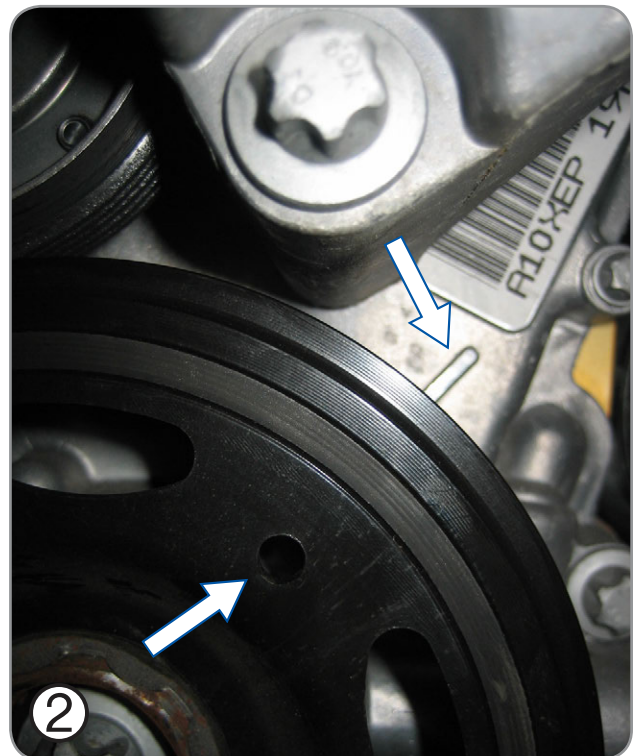
Timing Check

Remove the engine cover.

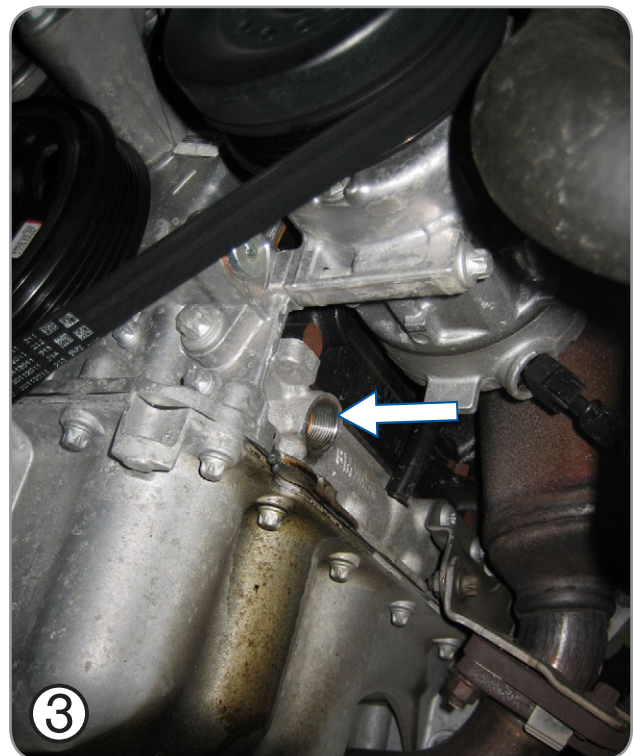


Remove the ignition module using a suitable tool, such as **4742 ignition module removal set**.

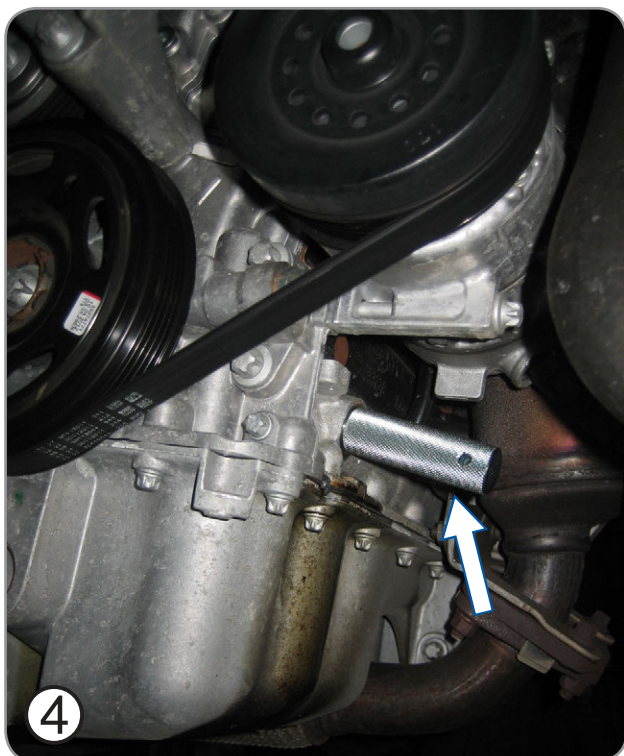
Remove the camshaft cover.



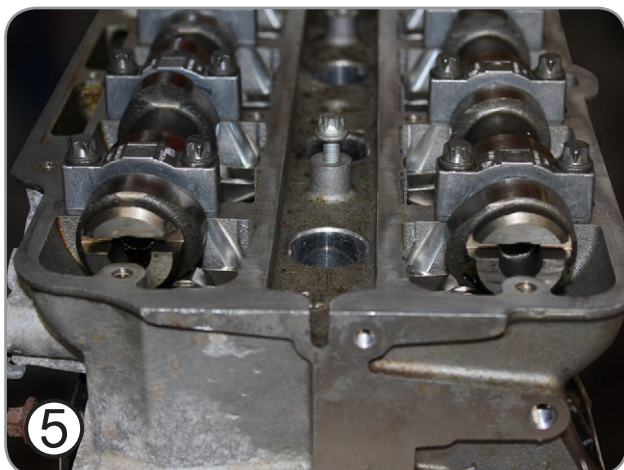
Rotate the crankshaft in the direction of engine rotation until the mark on the crankshaft pulley is aligned with mark on the engine.



Remove the blanking plug from the front of the engine.

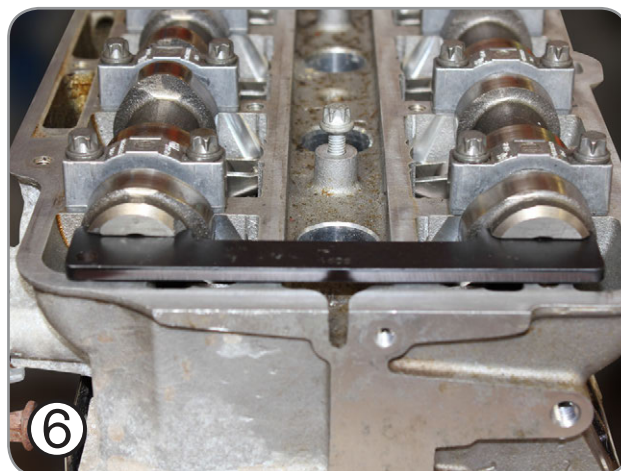


Install **4487 crankshaft locking pin** fully into the engine.
Ensure that the crankshaft is locked at TDC position.

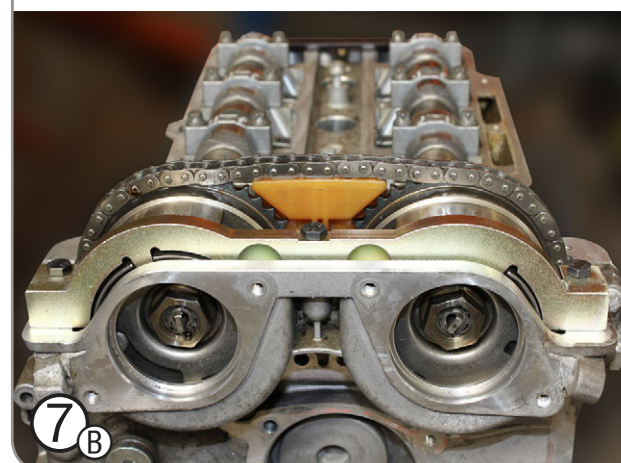
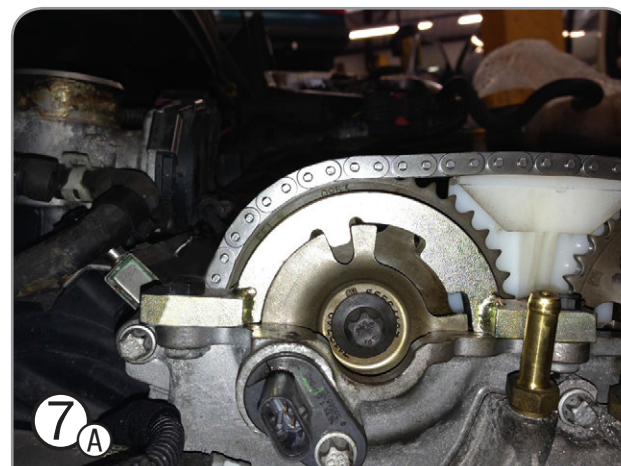


Check the position of the slots in the rear of the camshafts.
With no.1 cylinder at TDC position, the slots will be horizontal and above the surface of the cylinder head.

NOTE: If the slots in the camshaft are positioned horizontally but are below the surface of the cylinder head, remove **4487 crankshaft locking pin** and rotate the crankshaft one full revolution in the direction of engine rotation. Refit **4487 crankshaft locking pin**, then re-check the position of the slots in the rear of the camshafts.



Install **5091 camshaft setting plate** into the slots at the rear of the camshafts.



Select and install the appropriate VVT/camshaft sensor setting tool:
5092 for 1.0L (3 cylinder) engines. *Picture 7A*
5093 for 1.2L / 1.4L (4 cylinder) engines. *Picture 7B*

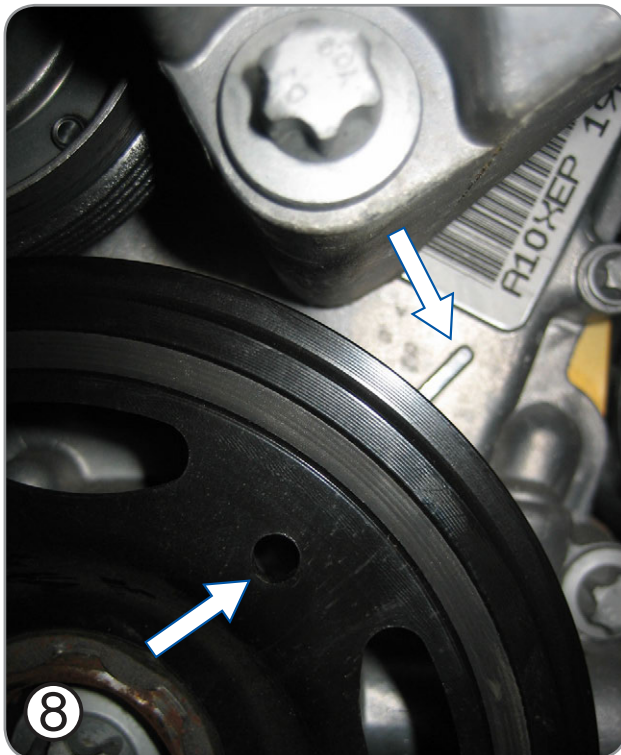
If it is not possible to correctly install the crankshaft locking pin, camshaft setting plate and VVT/camshaft sensor setting tool, then the engine timing will require adjustment.

Engine Timing - Adjustment

Remove all timing tools.

Remove the VVT solenoid valves from the cylinder head.

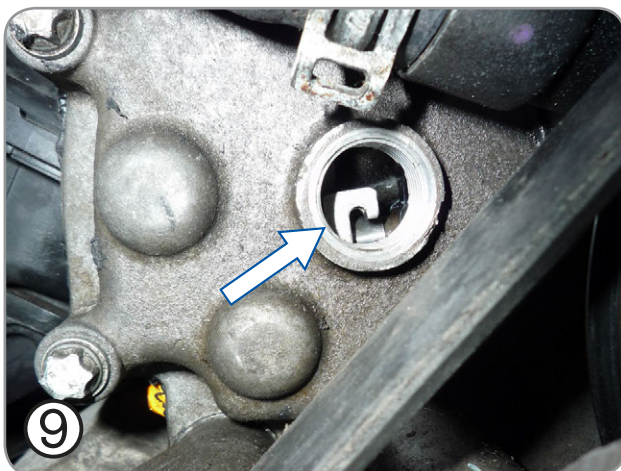
NOTE: VVT is not fitted on 1.0L 3 cylinder engines.



Rotate the crankshaft in the direction of engine rotation until the mark on the crankshaft pulley is aligned with mark on the engine.

Install **4487 crankshaft locking pin** fully into the engine. Ensure that the crankshaft is locked at TDC position.

Remove the timing chain tensioner cap.

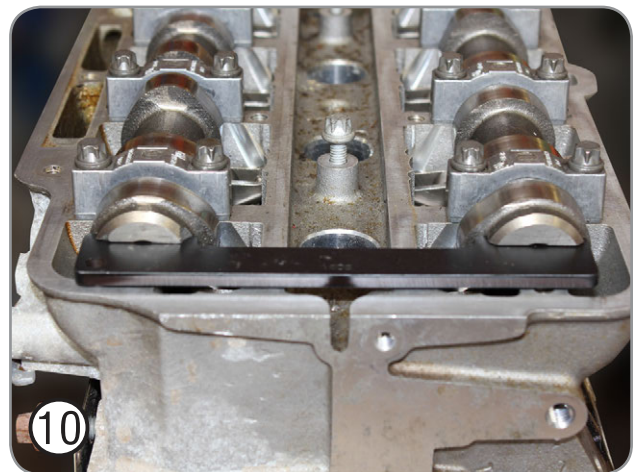


Using a suitable spanner on the machined hexagon of the inlet camshaft, apply a force in the direction of engine rotation - this

will compress the chain tensioner. Whilst the tensioner is in its compressed position, install **4489 tensioner locking pin**.

Using a spanner on the machined hexagon of the Inlet camshaft as a counter hold, release the central bolt of the camshaft sprocket until the camshaft sprocket / timing disc can be rotated freely.

Using a spanner on the machined hexagon of the Exhaust camshaft as a counter hold, release the central bolt of the camshaft sprocket until the camshaft sprocket / timing disc can be rotated freely.



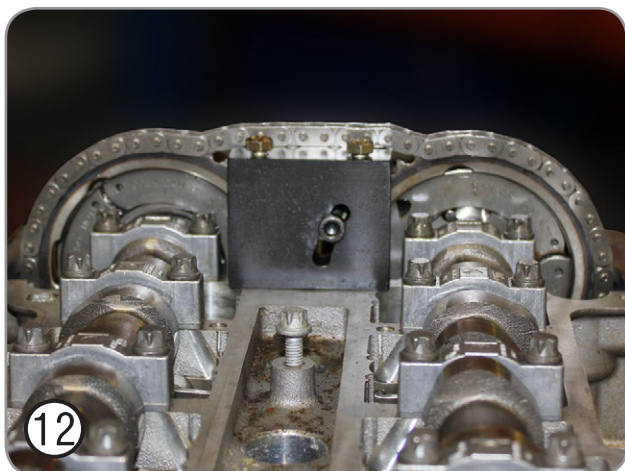
Using a spanner on the machined hexagon, adjust the position of each camshaft so that the slots in the rear of the camshafts are horizontal and above the surface of the cylinder head. Install **5091 camshaft setting plate**.



Replace the Camshaft sprocket central bolts, ensuring that the VVT units and sensor discs are free to rotate on the camshafts. Apply a small amount of clean engine oil to the flange of the new bolts before fitting to avoid rotation of the sensor disc during the final tightening procedure.

IMPORTANT: Ensure that the mating surfaces of the Camshafts, VVT units and Camshaft position sensor discs are clean.

Remove **4489 tensioner locking pin** from the timing chain tensioner.



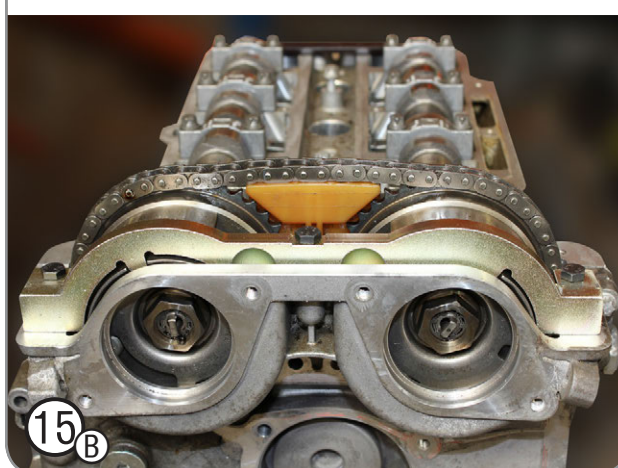
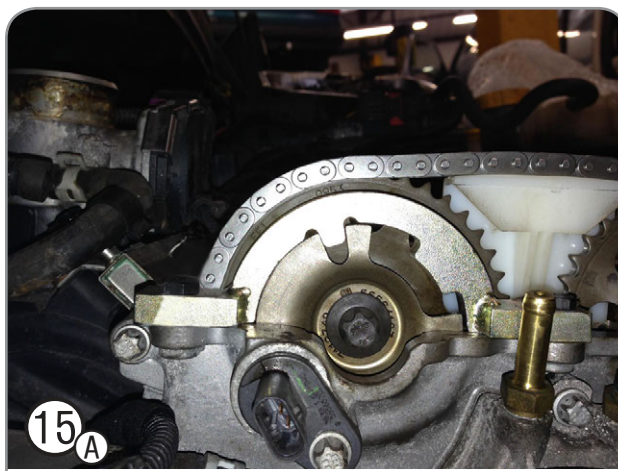
Remove the timing chain guide from the cylinder head.
Install **5094 camshaft sprocket holding tool** to the cylinder head, leaving the 2x retaining screws and 1x locking bolt loose.



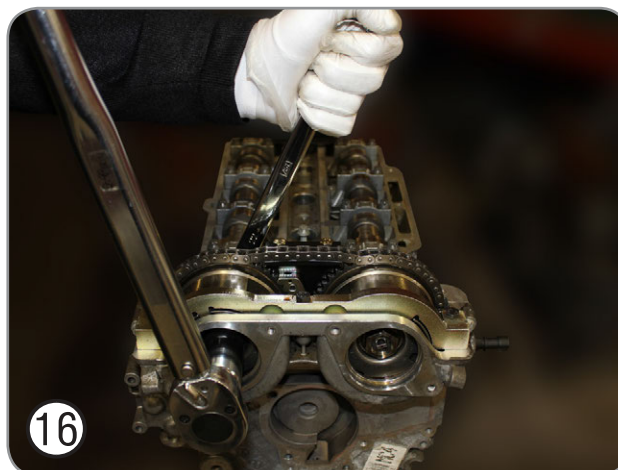
Slide **5094 camshaft sprocket holding tool** towards the inlet camshaft sprocket and tighten the two retaining bolts.



Adjust the locking wedge until it is fully located in the teeth of the inlet camshaft sprocket, then tighten the bolt to lock the wedge and sprocket in position.



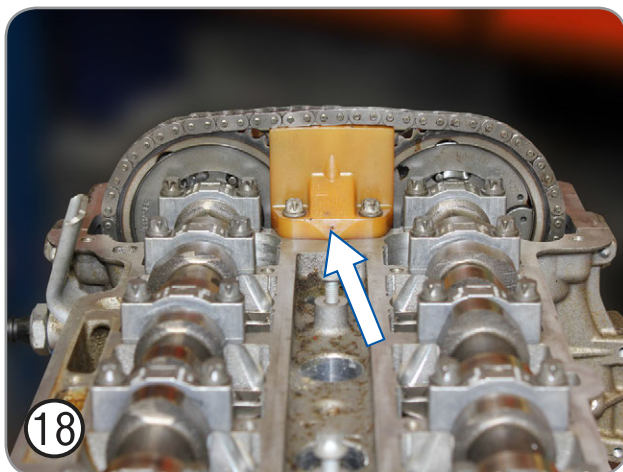
Install the appropriate VVT/camshaft sensor setting tool.
Use **5092** for **1.0L (3 cylinder)** engines. *Picture 15A*
Use **5093** for **1.2L / 1.4L (4 cylinder)** engines. *Picture 15B*



Using a spanner on the machined hexagon of the **Inlet** camshaft as a counter hold, tighten the central bolt of the camshaft sprocket to **50Nm**.



Using a spanner on the machined hexagon of the **Exhaust** camshaft as a counter hold, tighten the central bolt of the camshaft sprocket to **50Nm**.



Remove **5094 camshaft sprocket holding tool** and refit timing chain guide to cylinder head.

Remove all tools.

Rotate the crankshaft two full revolutions in the direction of engine rotation, returning to TDC on No.1 cylinder.

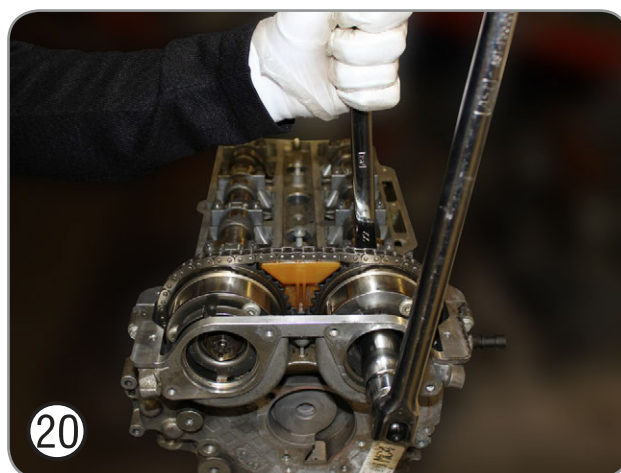
Check that the engine timing is correct by refitting **4487 Crankshaft locking pin**, **5091 Camshaft setting plate**, and **5092/5093 Camshaft Sensor setting tool**.

NOTE: If it is not possible to fit all tools correctly, the timing adjustment procedure must be repeated.

Remove all timing tools.



Using a spanner on the machined hexagon of the **Inlet** camshaft, counter hold and tighten the central bolt of the camshaft sprocket to its final torque value (**50Nm + 60°**).



Using a spanner on the machined hexagon of the **Exhaust** camshaft, counter hold and tighten the central bolt of the camshaft sprocket to its final torque value (**50Nm + 60°**).